Original Article

Investigation of tuberculosis contacts in the tuberculosis control program of a medium-sized municipality in the southeast of Brazil in 2002*

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ABSTRACT

Objective: This study aimed to describe the investigation of tuberculosis contacts enrolled in the Tuberculosis Control Program of the municipality of São José do Rio Preto, Brazil in 2002. **Methods:** A descriptive study was conducted using secondary data obtained from the Tuberculosis Notification Database, as well as charts and registries compiled by the São José do Rio Preto Tuberculosis Control Program in 2002. **Results:** A total of 166 household tuberculosis contacts were enrolled in the Program. Of those, 82 were male, and 84 were females. The incidence of tuberculosis was highest (70%) in the 15 to 59 age bracket: 42 (25.3%) of the cases occurred in individuals from 0 to 19 years of age; 73 (44%) in those from 20 to 49; and 44 (25.5%) in those 50 or over. In terms of their relationship with the index patient, 41 (24.7%) were children; 29 (17.5%) were partners; 22 (13.2%) were siblings, and 15 (9.1%) were mothers. The following tests were requested: (in 12%) sputum smear microscopy, culture or both; (in 100%) chest X-ray, revealing 2 suspected cases of pulmonary tuberculosis and 5 cases of other diseases; (in 7.2%) tuberculin skin test, the results of which showed that 4.2% were nonreactors, and that 1.2% presented an induration of 8 mm. Among the contacts examined, the disease was detected in 3 (1.8%). **Conclusion:** There is no systematization in the monitoring of individuals who are in contact with tuberculosis patients.

Keywords: Tuberculosis/mortality; Information systems; Prevalence

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INTRODUCTION

The World Health Organization estimates that approximately 100 million people worldwide are infected with tuberculosis each year, and that, in developing countries, the infection of adults is as high as 30% to 60%. It is estimated that, of those infected worldwide, 8 to 10 million will develop the disease in their lifetime, and that half of that number will present one of the infectious forms.[1]

The tendencies of case reports to update the incidence estimates used by 210 countries in 2003 revealed that, in 2002, there were 8.8 million new cases of tuberculosis, 3.9 million of which were of active tuberculosis. During this period, the global per capita incidence of the disease increased by approximately 1.1%, and the prevalence increased by 2.4%.[2]

It is estimated that 1.9 million tuberculosis-related deaths occur annually, and that 98% of those cases occur in developing countries. By 2020, if this scenario is not reversed, a billion people will be infected, and the active form of the disease will appear in 200 million of those, 35 million of which could die.[3]

The Ministry of Health estimates that the prevalence of tuberculosis in Brazil is 58 cases per 100,000 inhabitants, with approximately 50 million infected individuals. Annually, there are 111,000 new cases and 6000 deaths.[4]

In the state of São Paulo as a whole, the incidence of tuberculosis remained stable from 1981 to 2002. In recent years, the number of tuberculosis-related deaths has increased by 1400 deaths/year.[5]

The city of São José do Rio Preto, is considered a priority in the tuberculosis control program (TCP), accounting for nearly 50% of the cases reported to the XXII Regional Health Board of the São Paulo State Secretary of Health. In 2002, 135 cases of tuberculosis were reported in the city. Of those, 108 were of the pulmonary form and 27 were of the extrapulmonary form, with an incidence rate of 34.69/100,000 inhabitants. In 2003, tuberculosis was the third leading public health problem (among those for which reporting is compulsory) in the city, with 190 cases.[6]

With this in mind, many scholars are unanimous in emphasizing that the investigation of contacts contributes to the control of tuberculosis, either directly, through the detection of the source of infection, or indirectly, preventing the occurrence of other cases of the disease.

The source of infection is frequently an individual with the pulmonary form of the disease and shedding bacilli, depending on the bacteriological index (state). In a given community/year, it is estimated that one infection source can infect from ten to fifteen people who come into contact with that individual.[7]

The TCP recommends that all contacts of patients with tuberculosis, especially those that testing positive for the pulmonary form, should be referred to a health care facility for examination.[1,3]

Despite the recommendation of the TCP, we observe that, in practice, the investigation/monitoring of contacts has not been considered a valid means of identifying new cases.[1]

Among the contacts examined in the city of São José do Rio Preto in 2003, 14 cases of tuberculosis were diagnosed, two of which were in contacts of individuals diagnosed with tuberculosis in 2002.[6]

In view of the situation presented by tuberculosis worldwide, in Brazil and in São José do Rio Preto - the last considered a priority by the TCP - and believing in the importance of the tuberculosis contact in the epidemiological chain of the disease, we conducted this study, whose general objective was to describe the investigation of the contacts of individuals with tuberculosis enrolled in the TCP in the city of São José do Rio Preto in 2002.

METHODS

This is a study of an epidemiological, descriptive and retrospective nature, carried out based on a study of documental analysis, at the TCP Unit 60 of the Treatment Management Program of São José do Rio Preto, a referral center for the treatment of patients with tuberculosis in the municipality.

São José do Rio Preto is a medium-sized city, north of the state of São Paulo, approximately 450 km from the capital, with a population of 378,780 inhabitants.[8]

The city has a regional referral laboratory (Adolfo Lutz). The requests for sputum smear microscopy are sent together with spontaneous sputum samples collected at the health care centers. The sputum smear microscopies for diagnosis and control are registered separately, which facilitated the evaluation of the data.

The systems of registries and information from the laboratories are computerized, which prevents the loss of data. However, these data are transmitted from the laboratories to the Municipal Department of Health on a monthly basis, which delays the initiation of treatment of individuals testing positive for tuberculosis.

The 2002 data on the contacts of patients with tuberculosis were obtained from the analysis of tuberculosis reporting forms and registries of index cases, as well as from the Tuberculosis Epidemiology (Epi-TB) database of the Epidemiology Division of the Municipal and State Departments of Health. Each patient received an enrollment number, and a file was opened for the registration of the contacts.

Of the new cases of tuberculosis reported in São José do Rio Preto in 2002, 112 (87%) were reported at Unit 60 of the Treatment Management Program and, for these index-cases, 263 contacts were registered. Only 166 (63.1%) of these 263 contacts were evaluated at Unit 60 of the Treatment Management Program, since no contact data were available for the other 97 (36.9%), despite the fact that various secondary sources were consulted: São José do Rio Preto Municipal Department of Health Epi-TB reporting forms, standardized by the São Paulo State Department of Health Center for Epidemiological Surveillance, whose data are entered and stored in the Epi-TB database; charts and records of other patients treated at Unit 60 of the Treatment Management Program of São José do Rio Preto; follow-up spreadsheet on the tuberculosis contacts and previously tested instrument for data collection on the contacts of patients with tuberculosis registered in the charts of the index-cases, containing data regarding age bracket, gender, relationship with the index case and tests carried out.

The data were stored in a database of the Excel for Windows program and analyzed using the Epi Info program, version 6.04.

RESULTS

Of the contacts examined in 2002, 3 (1.8%) had the disease, as determined by the TCP.

Of the 166 contacts examined, 82 were male (49.4%) and 84 were female (50.6%). Regarding the age variable, 42 were from 0 to 19 years of age (25.3%) and 44 were age 50 or above (25.5%). It was also observed that 73 (44%) of the contacts examined were in the 20 to 49 age bracket, as can be seen in Table 1.

The types of relationships of the contacts with the tuberculosis index cases are presented in

TABLE 1

Distribution, by age and gender, of the contacts of patients with tuberculosis examined in the tuberculosis control program at Unit 60 of the Treatment Management Program, São José do Rio Preto, in 2002

Age (years)	Males n (%)	Females n (%)	Total n (%)
< 1	1 (0.6)	0 (0.0)	1 (0.6)
1 to 9	8 (4.8)	10 (6.0)	18 (10.8)
10 to19	12 (7.2)	11 (6.6)	23 (13.9)
20 to 29	14 (8.4)	11 (6.6)	25 (15.1)
30 to 39	11 (6.6)	9 (5.4)	20 (12.0)
40 to 49	13 (7.8)	15 (9.0)	28 (16.9)
50 to 59	10 (6.0)	14 (8.4)	24 (14.5)
60 and above	8 (4.8)	12 (7.2)	20 (12.0)
Unknown	5 (3.0)	2 (1.2)	7 (4.2)
Total	82(49.4)	84 (50.6)	166 (100.0)

TABLE 2

Distribution, by relationship with the index-case, of the contacts of patients with tuberculosis registered in the tuberculosis control program and examined at Unit 60 of the Treatment Management Program, São José do Rio Preto, in 2002

Type of relationship	n	%
Child	41	(24.7)
Partner/spouse	29	(17.5)
Sibling	22	(13.3)
Mother	15	(9.0)
Friend	14	(8.4)
Nephew/Niece	12	(7.2)
Father	8	(4.8)
Grandchild	8	(4.8)
Brother-/Sister-in law	5	(3.0)
Cousin	2	(1.2)
Father-/Mother-in-law	2	(1.2)
Son-/Daughter-in-law	3	(1.8)
Aunt	1	(0.6)
Grandmother	1	(0.6)
Neighbor	1	(0.6)
Unknown	2	(1.2)
Total	166	(100.0)

Table 2. Among the contacts examined, 41 (24.7%) were children of the index cases, 29 (17.5%) were their partners, 22 (13.2%) were their siblings, and 15 (9.1%) were their mothers.

Regarding the tests requested, 20 of the contacts examined were submitted to sputum smear microscopy, culture or both (12%), and the results of these samples were as follows: 18 (90%) negative, 1 (5%) positive and 1 (5%) inconclusive.

Of the contacts examined, 100% were submitted to chest X-rays and 1.2% to other methods.(2) There was no information in the charts of 3%.(5) Of those who were submitted to chest X-rays, 2 were suspected of suffering from pulmonary tuberculosis, and 5 were suspected of having other diseases. Twelve contacts were submitted to tuberculin skin test (7.2%). Of those, 7 (4.2%) were nonreactors, and 2 (1.2%) presented an induration of 8 mm.

The diagnostic resources for evaluation of infection and tuberculosis among the contacts in this study were chest X-rays in 159 (95.8%) and were unknown in 7 (4.2%). At this health care facility, there is an X-ray machine, which is the diagnostic resource most often used in monitoring the contacts of the cases of tuberculosis.

As can be seen in Table 3, the patients with tuberculosis were predominantly - in 69 (61.68%) of the cases - referred from hospitals and public outpatient clinics. In addition, 12 (10.7%) of the cases were referred from basic health clinics, 44 (39.3%) from public hospitals and 16 (14.3%) from private philanthropic hospitals.

TABLE 3

Distribution, by institution of origin, of the cases of tuberculosis reported to the tuberculosis control program at Unit 60 of the Treatment Management Program, São José do Rio Preto, in 2002

Origin of referral	n	%
Public hospital	44	(39.3)
Private philanthropic hospital	16	(14.3)
Public outpatient clinic	25	(22.3)
Basic health clinic	12	(10.7)
Private medical office	7	(6.3)
Penitentiary	8	(7.1)
Total	112	(100.0)

DISCUSSION

The norms of the Ministry of Health recommend that all contacts of patients with tuberculosis be examined at the health care center, giving priority to the smear-positive patients (those with pulmonary tuberculosis).[1,3]

It is estimated that, on average, there are four contacts per each diagnosed case of tuberculosis.[9] Considering that 122 cases were diagnosed at the health care center analyzed, it was expected that 448 contacts would be examined. However, only 166 contacts were actually examined, which corresponds to an examination coverage of only 37%. This fact demonstrates that the monitoring of contacts of patients with tuberculosis has not been systematically incorporated by the TCP in the municipality studied.

The organization of the health care offered to tuberculosis contacts shows a preoccupation with responding to health indicators in order to monitor the quality and appropriateness of the treatment provided by the health clinic, with a focus on prevention measures. The health clinics need to incorporate epidemiological surveillance, identifying contacts, carrying out the tests and performing follow-up evaluations in a preventive manner.

In the present study, 3 (1.8%) of the contacts identified had already acquired the disease (1.8%), and the other 163 were asymptomatic (89.2%). A study carried out in São Paulo demonstrates that the discovery of cases of tuberculosis among the contacts in the health clinics represented a small portion (2-3%) of the total number of cases diagnosed.[10]

The result of an investigation of contacts of patients with tuberculosis in public health clinics in the USA demonstrated, on average, four close contacts per patient, of whom 2% had active tuberculosis, and the contact was more frequent among individuals in the same household and children under six years of age.[11]

In the present study, we found that the contacts were predominantly adults, which agrees with the literature showing that tuberculosis principally affects people between 15 and 59 years of age.[1]

The combination of the age of the cases with the production of infection in the group is due both to the greater number of contacts and to the greater risk of infection of the latter, together with

the age of the source. The role of age in infectiousness is an aspect that needs to be studied, and is even likely to modify some concepts on the importance of the bacteriological state of the sources of infection. Among the various explanatory hypotheses is the one that the effect of age can be attributed to the different behavior, culturally determined, of the various age brackets, rather than to some biological factor.[12-13]

This study identified a significant number of people who, due to their proximity to the index case, run a great risk of being infected, as can be principally observed in the children of index cases (24.7% of which became infected).

In a study carried out with infant contacts in the same household, it was clear that the parents were the most frequent source of infection for the children. Among the children who had contact with more than one source of infection, 35.3% developed the disease, and, when the source of infection was the mother or the father, 12.4% developed the disease.[14]

The contacts who were married or living with steady partners represented the second largest category in this study (17.5%), revealing a greater chance of contamination, whether they were spouses or partners of the index cases.

The risk of developing the disease for a person whose spouse suffers from tuberculosis is 2 to 40 times greater than that of the population in general, which allows us to conclude that the proximity of the contact is one of the important aspects to be considered in the transmission of the bacillus.[15]

The clinical form of the index case that was predominant in this study was the pulmonary form (seen in 87.3% of the cases), which ratifies the data found in the literature showing that the predominant form is the pulmonary form.[16-17]

The risk of an infected individual developing tuberculosis does not depend only on the age of the individual and the length of time elapsed since the infection, but on the bacteriological state of the source.[18]

The intensity of the contact is one of the conditions that allow tuberculosis to be associated with the low income population, which consists of large families living in close quarters, in small humid houses with little ventilation.

Chest X-ray studies are always indicated as an auxiliary method in the following cases: symptomatic respiratory, smear-negative patients; contacts of patients with active tuberculosis, of all ages, living in the same household or institutionalized, with or without respiratory symptomatology; patients suspected of extrapulmonary tuberculosis; infected with the human immunodeficiency virus or presenting acquired immunodeficiency syndrome.[4]

Various studies have shown the importance of a one- or two-year clinical and radiological follow-up evaluation of the contacts of patients with active tuberculosis, principally those living under unfavorable socioeconomic conditions.[1,19-20]

Nevertheless, there are other more complex methods for the diagnosis of tuberculosis, such as molecular biology analysis. However, the routine use of molecular biology techniques in the investigation of such contacts is not a feasible strategy in most developing countries in which there are a great number of cases.

Notable among the limitations of this study are the failures in registering the case reporting data, as well as omissions in the charts and in the Epi-TB information system. These limitations refer to the use of secondary data sources.

The quality of the data depends on the system used to search through the cases and registries of each area. The global registries underreport the number of cases, reaching only approximately half of the value estimated by the World Health Organization.[21]

The data presented in relation to the organization of the program show that it lacks systematization regarding the monitoring of the evaluation of the contacts of patients with tuberculosis. The attention is thus centered on the ill individual, in isolation, and the activities directed toward the contacts are partial, with little value given to prevention.

The model that values measures aimed at treating diseases or rehabilitating patients with sequelae has been given priority by the health care centers. Each health problem is defined as having one or more causes and, in order to solve it, it is enough to find the cause and eliminate it or correct it through a medical intervention. This means that more diseases and more patients should be treated by more health care facilities, independently of the determining factors being oriented toward the social production of diseases.[22]

Actually, it is necessary to expand the

epidemiological view of the professionals in health care facilities in order to implement practices of surveillance and monitoring, not merely in terms of data collection and analysis, but developing technical bases as well. These would facilitate the development and implementation of health measures in health care clinics, allowing greater streamlining in the identification of problems and providing the opportunity to control such problems through intervention.

One of the problems faced by the health clinic analyzed in this study was related to the centralization of the TCP activities in a secondary-care referral clinic. The advances in the restructuring and reorganization of its health system notwithstanding, the city works with the conception of a fragmented system. The Ministry of Health proposes that measures to control the disease be developed at the primary level of treated, designated basic treatment, which has not yet occurred in the health care system studied.[23]

The decentralization of the TCP activities creates both opportunities and risks in relation to the continuity of these activities. Decentralization might increase the efficiency and quality of services, as well as improving the analysis and use of the data. However, decentralization might also result in a lack of conscientiousness/commitment, fragmentation and difficulties in developing programs, as well as creating deficiencies in the information system.[24]

With the centralization of the TCP measures, the team does not work with a restricted population, focused on the family and communitarian orientation, and, there is therefore no way to define the community it serves or to determine its characteristics in sociodemographic and health terms. This makes it difficult to systematize the treatment offered to the tuberculosis contacts in relation to the practices of surveillance and monitoring.

In basic treatment, there is less technological density (less equipment, fewer highly sophisticated tests), although the problems and situations dealt with present more complex profiles of health and disease. This demands more closely supervised instruction in the use of interventions for highly structured health problems, such as lack of compliance, in order to perform follow-up evaluation of the disease or of chronic conditions, such as tuberculosis, leprosy and acquired immunodeficiency syndrome, as well as of situations of biological and social risk.[25]

The complexity of the control measures used for the contacts of patients with tuberculosis calls for a great deal of knowledge regarding the systematic monitoring of such contacts, continuous follow-up evaluation, using, over the course of the treatment of the case-index, as described above, the wisdom accrued in other fields of science. All of these factors lead to the understanding that the evaluation of tuberculosis contacts is a measure of greater technological complexity.

Another important aspect that merits attention in order to bring about a change in the practice of health clinics, systematizing the evaluation of the contacts, is the development and implementation of undergraduate programs and continuing education for the professionals already working in the health clinic. It is important to have consistent integration between teaching, research and treatment sectors in order to devise strategies for educating health professionals in a more comprehensive way.

In conclusion, adopting intervention strategies that will contribute to the improvement of the quality of the services offered to the contacts of patients with tuberculosis constitutes a challenge to the TCP administrators of the municipality. For these control measures to be effective, it is necessary to develop strategies for the professionals, through systematized protocols, thus guaranteeing continuity in the treatment provided at this clinic in a humane and comprehensive manner, focusing on preventive measures.

Among the recommendations for improvement and performance of the control measures of contacts of patients with tuberculosis in the clinic studied, we can highlight the restructuring of the TCP in the municipality, taking into consideration the need to decentralize some measures that should be performed as basic treatment, such as active search for symptomatic respiratory patients, requests for laboratory tests for the diagnosis and evaluation of the cases, supervised or self-administered treatment, identification/evaluation of contacts and registering/disseminating data (reporting of cases, creating/updating patient records and monitoring the treatment of the cases de tuberculosis).

The use of a registration form for the contacts allows, through an active search of those who were registered and did not report to the health clinic to be examined, the identification of individuals not yet evaluated. A protocol of treatment/follow-up should be devised for the tuberculosis contacts registered at the clinic.

The standardization of practices should be evidence-based, planned by a multidisciplinary team and periodically assessed/modified by a specialist in the presence of those who will later implement those practices. It should be based on the results of the activities of monitoring, epidemiological surveillance and evaluation of the measures developed in the TCP, with an instrument of information for the planning, technical recommendations, evaluation and periodic reformulation of the TCP.

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